

IN THE MATTER OF SECTION 13 of the Consolidated Hearings Act, S.O. 1981, c.20

- and -

IN THE MATTER OF an application by the Regional Municipality of Halton for:

- a) the acquisition of land for the construction, operation and maintenance of a sanitary landfill site to contain 7.96 million cubic metres of waste in the Regional Municipality of Halton by one of two alternative methods as follows:
 - i) landfilling at the site referred to in Halton's Environmental Assessment as Site F in the City of Burlington;
 - ii) landfilling at the site commonly referred to in Halton's Environmental Assessment as Site D in the Town of Milton.

- and -

IN THE MATTER OF a decision by the Joint Board under the Consolidated Hearings Act, S.O. 1981, c.20, dated February 24, 1989.

APPLICATION

TO THE LIEUTENANT GOVERNOR IN COUNCIL

ON BEHALF OF
MILTON AREA CITIZENS' COALITION
HALTON FEDERATION OF AGRICULTURE
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WALTER TOMOSKY
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EXECUTIVE SUMMARY

The Applicants herein seek the Order requested in this Application to rescind or vary the decision of the Joint Board which refused to grant approval to the Regional Municipality of Halton to establish and operate a municipal waste landfill site at the Region's preferred site known as Site F, in the City of Burlington. The Board found that Site F would be hydrogeologically unsuitable, as proposed to be designed by the Region and also found that Site F would be hydrogeologically unsuitable, even if designed with a liner designed and installed to the specifications of the Director of Approvals of the Ministry of the Environment.

The Board instead approved the Region's second choice, Site D, in the Town of Milton. If Site D is approved for landfilling, four families who are applicants herein would be expropriated from their homes and properties and 42 families would be living within a study area of about 500 metres from the site (the distance that Ministry of the Environment Guidelines suggest is the distance within which most significant adverse impacts would normally be expected to occur from landfill sites). Site D is also prime farmland in the middle of a farming community which the Region considers to have long term agricultural viability in Halton.

Site F, the Region's preferred site, is vacant land and its owners are supporting the use of the land for landfilling. No one would need to be expropriated against their will. Only 6 residences fall within a study area of approximately 500 metres from Site F; all at least 300 metres from the site. Beyond 750 metres from Site F, and separated by a series of physical buffers including: a hydro transmission corridor, the North Service Road, Highway 403, a CNR right of way and rail line, a CNR marshalling yard, substantial acreages of vacant industrial land and topographic relief is the residential part of the community of Aldershot (West Burlington).

Landfill sites have been operated adjacent to Site F (both sides) for over 40 years and extensive monitoring work has not identified any significant ground water contamination from these sites. However, these sites were originally not engineered to today's standards and at one time caused surface water contamination which flowed through the community of Aldershot causing public concern. Those problems have now been resolved by remedial engineering works installed by the City of Burlington and the Region of Halton. These sites do not now represent any risk to public health and safety. Nevertheless, concerns persist in the community.

The Ministry of the Environment took the position before the Board that Site F, as proposed by the Region, was hydrogeologically suitable and environmentally safe and would meet all its recent policies regarding the hydrogeologic

suitability of landfill sites which are used to judge the
suitability of landfill sites throughout Ontario.

11/08
position
D.

The approval of Site F, subject to the conditions of approval proposed by the Ministry of the Environment, would also be in compliance with the policies and positions of the Ministry of Agriculture and Food, the Ministry of Natural Resources and the Minister of Municipal Affairs regarding the Parkway Belt West Plan.

It is submitted that the decision of the Board is
unreasonable and should be rescinded or varied because;

miss
site selection
full sites

1. The Board created and applied criteria for hydrogeologic suitability which are inconsistent with official policies of the Ministry of the Environment, used to judge the suitability of sites throughout Ontario;

not that D approvable

2. Critical findings are contrary to all expert opinion evidence that the Board heard;

3. It is not a reasonable balancing of the evidence heard by the Board;

4. It forces the expropriation of families from their homes, properties and businesses against their will when it is not fair, sound or reasonably necessary to do so on an objective balancing of the evidence before the Board.

A. ORDER REQUESTED

The applicants herein apply to the Lieutenant Governor in Council for an Order:

1. Rescinding the decision of the Joint Board made February 24, 1989 regarding this matter and substituting for that decision, a decision that grants all necessary approvals being sought by the Regional Municipality of Halton to establish and operate a landfill site at the site referred to in Halton's Environmental Assessment as Site F, subject to the conditions of approval proposed at the hearing by the Ontario the Ministry of the Environment (Appendix A and Appendix B); or, in the alternative,

2. (a) varying or rescinding those parts of the decision of the Joint Board which make the following findings:

(i) That Site F is hydrogeologically unsuitable if designed as proposed by the Region of Halton and supported by the Ministry of the Environment;
(Decision, page 112, 113)

(ii) That Site F would be hydrogeologically unsuitable for landfill, even if designed with a liner in addition to the design proposed by the Region of Halton and supported by the Ministry of the Environment;
(Decision, page 109, 112, 113)

(iii) That there would be essentially equal social impacts at both Sites F and D. The Board finds that: "...there would be a serious social impact at both sites. At Site F the impact would be more diffuse and less serious for a large number of people. At Site D social impact would be severe for a small number of people. The severity of impact would diminish with distance from the site." (Decision, page 28)

(iv) That approval would be granted pursuant to Sections 6, 7, and 8 of the Expropriations Act, R.S.O. 1980, c.148, to acquire the lands at Site D, including the homes and properties of Watkin and Doreen Martin, Walter Tomosky, Thomas and Mary-Jean Martin and Michael and Cynthia Reed for constructing, operating and maintaining a landfill site in the Region of Halton. (Decision, page 150)

(v) That the Government of Ontario Foodland Guidelines, 1978 "...have not yet become official provincial government policy." (Decision, page 40)

(b) The Applicants herein respectfully request the following substituted findings:

(i) That Site F is hydrogeologically suitable if designed as proposed by the Region of Halton and if made subject to the conditions of approval proposed at the hearing by the Ministry of the Environment.

(ii) That, in any event, Site F would be hydrogeologically suitable for landfilling, if designed with a liner satisfactory to the Director of Approvals of the Ministry of the Environment, as contemplated (but not considered necessary) by the Conditions of Approval (Section 2.1.3) proposed at the hearing by the Ministry of the Environment.

(iii) That pursuant to Section 6, 7 and 8 of the Expropriations Act, R.S.O. 1980, c.148, that it is not fair, sound or reasonably necessary to expropriate Martin, Tomosky, Martin and Reed from their homes and properties in order to provide an acceptable landfill site to meet the needs of the Region of Halton.

(iv) That it is not reasonable to equate the "diffuse" and "less serious" social impacts that would result at Site F to a larger population distant from the site with the "severe" social impacts that would result at Site D to fewer people who are both on site and immediately abutting the site. That it is the social impacts associated with displacing people from their homes and property against their will and the social impacts on immediately abutting residents and property owners that should be of greatest concern in locating a landfill site.

(v) That the Foodland Guidelines, 1978 are official provincial government policy.

B. GENERAL BACKGROUND INFORMATION

The Regional Municipality of Halton (Halton) has the statutory responsibility to provide waste disposal facilities for its inhabitants pursuant to Section 137 of the Regional Municipality of Halton Act, R.S.O. 1980, c.436, as amended. Pursuant to the requirements of the Environmental Assessment Act, R.S.O. 1980, c.140, as amended, Halton engaged a team of consultants (Walker, Wright, Young and Associates) in 1983 who conducted an environmental assessment which identified Site F in the City of Burlington as the preferred site for the landfill component of Halton's waste management system (Exhibit H-13). Site D in the Town of Milton was identified as the second ranked site. Regional Council subsequently directed its consultants to do additional technical studies on both Sites F and D and to do a comparative analysis of the two sites based on this more detailed information. The result of that more detailed comparative analysis confirmed that Site F was the preferred site (Exhibit H-14).

Believed to choose →
→
Regional Council considered this comparative analysis and the advice of its staff and solicitors and determined to make application for approval of a landfill site at either Site F or Site D, while expressing a "marginal" preference for Site F in the City of Burlington. This position was maintained by the Region and its consultants throughout the hearing before the Joint Board.

DD at beginning re WBC6

* NO Appearance by OMAF }

The Milton Area Citizens' Coalition is a group of residents and property owners in the immediate vicinity of Site D in the Town of Milton. The Coalition was given party status in the hearing and was represented by Counsel throughout. Two expert planners and approximately 30 lay witnesses who are members of the Coalition were called to testify at the hearing. Mr. and Mrs. W.D. Martin, Mr. W. Tomosky, Mr. and Mrs. Thomas Martin and Mr. and Mrs. M. Reed are owners of homes and property who will be expropriated against their will if Site D in Milton is approved as a landfill site. They all testified against the expropriation of their property. No one will be expropriated against their will if Site F is approved for landfilling. The Site F lands are vacant and the two companies that own the land both wish it to be used for landfill purposes.

The Halton Federation of Agriculture is opposed to the use of Site D and prefers the use of Site F because Site D is actively farmed prime farmland in the middle of an agricultural community that is considered to have long term viability, and Site F is not prime farmland and is not part of an agricultural community.

Site D was also opposed at the Board hearing by the Corporation of the Town of Milton. The owners of the majority of the land at Site F, NSP Investments Limited were also represented throughout the Board hearing in support of landfilling at Site F.

"weight of evidence" →

Site F was opposed by the Corporation of the City of Burlington and the West Burlington Citizens' Group, a residents association in Aldershot.

Both the Ministry of Environment and the Ministry of Natural Resources were represented by Counsel at the Board hearing. The positions of those Ministries and the position of the Ministry of Agriculture and Food are referred to in Part D of this Application.

C. THE DECISION OF THE JOINT BOARD

1. With Respect to the Hydrogeologic Suitability of Site F:
Designed as Proposed (without a liner)

The Board decided that "...Site F is not hydrogeologically suitable for landfilling, but Site D is hydrogeologically suitable." (Decision, page 112)

Based primarily on this finding, the Board concluded that:

"In the Public Health and Safety category overall, this Board finds Site F clearly unacceptable, and Site D acceptable with the conceptual design proposed and appropriate conditions applied." (Decision, page 113)

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SITE D
acceptable
"preferable"

2. With Respect to the Acceptability of Site F with a Liner:

The Board decided that:

"Finally, with respect to the matter of the security offered by a liner beneath Site F, the Board noted that the strongest supporter of such an expensive measure, Mr. Crutcher, could not guarantee that a liner would not become fractured as a consequence of being laid down over different areas of intact bedrock and filled river valleys. Even with a liner in place, Mr. Crutcher predicted losses ranging from 1,509 gallons per day to 2,446 gallons per day, for the relatively benign situation where the water table would exist between the upper and lower boundaries of the liner. For the less favourable situation of the water table falling below the liner, leachate losses would increase. Regardless of its integrity, the cost/benefit implications of this palliative cannot be ignored." (Decision, page 109)

With respect to the cost of a liner the Board found that:

"The net present value cost of installing a liner at Site F, should one be required, was estimated by Mr. Watson to be in the order of 5.1 million dollars. The use of clay till already on-site for the liner could reduce that cost somewhat. The Board found an assumption of four million dollars for such a liner in the reasonable range of costs. In his analysis, Mr. Stamm stated that the clay liner at Site F was the single largest construction costs difference." (Decision, page 143)

and that;

"Finally, it is likely that if Site F were approved for landfilling it would require a liner. The conservative estimate for the cost of the liner is about 4 million dollars. (Decision, page 147)

The total costs of establishing a landfill site at either Site D or Site F is estimated by the Region, and found by the Board to be approximately 60 to 70 million dollars. (Decision, page 145)

3. With Respect to Resource Policy Considerations

The Board found that:

- (a) "...the Foodland Guidelines have not yet become official provincial government policy." (Decision, page 40)
- (b) "Because of speculative pressures there is very little, if any, agricultural profitability in this area (i.e. at Site D)." (Decision, page 38)
- (c) That the impact on agriculture at Site D was equivalent to the impact on the shale resource at Site F.
(Decision, page 36-41)

4. With Respect to Social Impacts

With respect to social impacts the Board found that there would be essentially equal social impacts at both Sites F and D.

The Board's analysis of social impacts ends with the conclusion that:

"On the subject of social impact in general, the Board was persuaded by the end of the Hearing that there would be a serious social impact at both sites. At Site F the impact would be more diffuse and less serious for a large number of people. At Site D social impact would be severe for a small number of people. The severity of impact would diminish with distance from the site." (Decision, page 28)

5. With Respect to the Expropriation of Landowners at Site D

The Board purported to give approval to the acquisition of the lands known as Site D, including the homes and properties of Watkin and Doreen Martin, Walter Tomosky, Thomas and Mary-Jean Martin and Michael and Cynthia Reed, for constructing, operating and maintaining a landfill site in the Region of Halton.

(Decision, page 150)

D. GROUND'S FOR THE ORDER REQUESTED

1. With Respect to the Hydrogeologic Suitability of Site F:
Designed as Proposed (without a liner)

It is respectfully submitted that the finding by the Joint Board that Site F is hydrogeologically unsuitable as proposed to be designed by the Region of Halton, and as found suitable for approval by the Ministry of the Environment, is a finding that should be rescinded for the following reasons.

Firstly, it is a perverse finding that does not reflect a reasonable or objective balancing of the credible expert evidence that was led at the hearing; secondly, it is based upon the application of criteria for acceptability of the Board's own creation which are inconsistent with official policies of the Ministry of the Environment; and thirdly, it reveals a fundamental misunderstanding on the part of the Board as to its role in the administrative decision making process.

It is the position of both the Region of Halton and the Ministry of the Environment that Site F, designed as the Region had proposed and subject to the conditions proposed at the hearing by the Ministry, was hydrogeologically suitable.

Liner
(a) The position of the Region of Halton at the conclusion of the hearing was that the evidence was overwhelming in support of a conclusion that Site F was hydrogeologically suitable as proposed by the Region (without a liner). This position was outlined by Counsel for the Region in his final submissions on this topic as follows:

*citing
Region's argument*

"First, on Site F. In my respectful submission, at Site F, all of this evidence comes down to a single question. Does Site F need a liner. At Site F, all investigators agree that the site can be safely used for landfill. The only outstanding issue between the investigators in my respectful submission, is the question of whether or not Site F needs a liner. The argument all comes down to the degree of engineering required and I propose to focus my attention on Site F on this single question.

There is, of course, a related question. If Site F needs a liner, does it need an \$18,000,000 liner or will a less expensive liner do? Since it is not the case for the Region that any sort of a liner is justifiable at Site F, I do not propose to get into the question of what sort of a liner is appropriate in my argument. It is Mr. Estrin who called the evidence of Mr. Gray and Dr. Rowe to convince you that a gold plated liner is not needed at Site F and I do not propose to get into that dispute for this reason. In my respectful submission, there is no credible evidence before you that a liner is needed at Site F. Let me repeat, there is no credible evidence before you that a liner is needed at Site F. That is, in my submission, there is no evidence that is sufficiently well developed, sound and believable for you to conclude that a liner is appropriate at Site F." (Transcript Volume 177, pages 44007-44008, emphasis added)

Hughes
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The position of the Ministry of the Environment was put before the Joint Board both by way of evidence from Dr. George M. Hughes, Supervisor, Landfill Disposal Technology Unit, Waste Management Branch, Ministry of the Environment and by way of submissions by Counsel for the Ministry of the Environment.

Dr. Hughes filed a witness statement (Exhibit E-928) and appeared before the Board to testify regarding the Ministry's policies and guidelines relating to the technical acceptability of sites for landfilling municipal waste. (Transcript Volumes 167 and 168, August 23 and 24, 1988). Dr. Hughes' witness statement explained that he was not giving evidence about the hydrogeologic suitability of either specific site which was being considered by the Board but that he was giving evidence "...to explain two Ministry policies which are applicable to the consideration of the hydrogeologic suitability of the two sites." (Witness Statement of Dr. George M. Hughes, June 1988, page 2, emphasis added).

There are two official Ministry of the Environment Policies which are applicable to the consideration of the hydrogeologic suitability of a landfill site:

- (i) Ministry of the Environment Policy 15-08, "Incorporation of the Reasonable Use Concept into MOE Groundwater Management Activities" (Exhibit E-154); and,

(ii) Ministry of the Environment Policy 14-15, "Engineered Facilities at Landfills that Receive Municipal and Non-Hazardous Wastes" (Exhibit E-928, Schedule B).

After the conclusion of evidence at the hearing, Counsel for the Ministry of the Environment, Mr. John Tidball, in his final submissions, summarized the Ministry's position on the suitability of Site F for landfilling municipal waste as follows:

✓ "The position of the Ministry set out below is that both Sites D and F are acceptable under the EPA (Environmental Protection Act) and that either site could be given a certificate of approval ... The Ministry takes no position overall in support of one site over the other. ...It is submitted that impacts on surface and ground waters have been given appropriate weight in the environmental assessment and that either site is acceptable with respect to those issues." (Summary of Final Submissions on Behalf of the Ontario Ministry of the Environment by Mr. John R. Tidball, Counsel for the Ministry of the Environment, October 17, 1988, paragraph 13).

Specifically, with respect to the acceptability of Site F, with respect to ground water and surface water impacts, designed as proposed by the proponent, the Regional Municipality of Halton, Counsel for the Ministry of the Environment summarized the Ministry's position at the end of all the evidence as follows:

"Ground Water Impacts

19. It is submitted that there are three primary criteria which must be satisfied in order to conclude that the impact of a proposed landfill site on ground water is acceptable. They are:

- (1) It should be demonstrated that any predicted leachate migration from the landfill will not impair the reasonable use of ground water on adjacent property.

- (2) It should be demonstrated that a monitoring program can be developed which will be capable of identifying any movement of landfill-derived contaminants.
- (3) It should be demonstrated that feasible contingency measures will be available to mitigate any impact on adjacent property that is identified by the monitoring program.

20. A certain degree of predictability is inherent in all three suggested criteria but predictability in and of itself should not be a separate and distinct criterion.

21. There are two policies of the Ministry of the Environment which are directly applicable to the first criterion. The "Reasonable Use Policy" (Exhibit E-154) sets out the basis for determining the reasonable use of ground water on adjacent property and suggests a method of determining the level of acceptable discharge to ground water. The "Engineered Facilities Policy" (Appendix B to Exhibit E-928) applies to the viability and long term maintenance of engineered facilities proposed to prevent unacceptable off-site impacts over the anticipated contaminating life-span of a landfill site.

Surface Water Impacts

22. It is submitted that the criterion for determining the acceptability of a proposed landfill site in terms of surface water impacts should be that it is demonstrated that any predicted leachate migration from the site will have no impact on surface water. While the Ministry's MISA program (Exhibit E-930 is the MISA White Paper), is not directly applicable to indirect discharges from a landfill, it is submitted that a consistent approach would require the use of the best available technology to prevent discharges to surface water.

Site F

36. It is submitted that, in the vicinity of Site F, the reasonable use of ground water in the Queenston Shale is contaminant attenuation and the reasonable use of the ground water in the lacustrine sands south of Highway 403 is drinking water. Ground water in the Queenston Shale does not constitute a viable resource in terms of quantity or quality because of its poor quality and limited yield. The reasonable use policy will bear the interpretation suggested and in all the circumstances it is submitted it is the only reasonable interpretation. On the other hand, the ground water resource in the "rind" in Aldershot has some limited present and potential use.

37. It is submitted that the hydrostratigraphic interpretation advanced by Trow Hydrology Consultants Limited was a simplistic interpretation necessary for the purposes of impact assessment but is not supported by the evidence. It is submitted that the most reasonable hydrostratigraphic interpretation that can be made at Site F is the interpretation advanced by Mr. Stan Feenstra in reply evidence.

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D complex
SITE

38. While the majority of the hydrogeologic debate throughout the hearing focused on the magnitude of the infiltration to the deeper shale, it is submitted that the most reasonable interpretation is that very little infiltration passes below the "active zone", perhaps in the order of 1 millimetre per year. The existence of an "active zone" in the Queenston Shale is supported, in part, by every hydrogeological witness called before the Board.

39. The "active zone" in the Queenston Shale is imprecisely defined at the present time. However, the weight of the evidence before the Board is that discharge from the active zone will be to surface water in relatively close proximity to the site. It is submitted that a deep perimeter drain suggested by Mr. Feenstra is an essential element of the design of Site F.

40. It is submitted that it is common ground on the part of all hydrogeologists that there will be no impact on the ground water in the lacustrine sand deposit in Aldershot.

41. It is submitted that it has been demonstrated that any leachate migration from Site F will not impair the reasonable use of ground water on adjacent property. Therefore, Site F can meet suggested criterion 1.

42. It is submitted that the applicant has demonstrated that a monitoring program can be developed at Site F that is capable of identifying the movement of landfill-derived contaminants. Condition 12.1 in the Site F EPA Conditions adopts many of the proposals made by Mr. Feenstra with regard to ground water monitoring. With the imposition of that condition, Site F can meet suggested criterion 2.

43. The applicant has suggested that ground water from the shale could be pumped with purge wells in the event that impacts are unacceptable. It is submitted that feasible contingency measures have been demonstrated to be available to mitigate any unanticipated impacts and therefore Site F can meet suggested criterion 3.

44. It is therefore submitted that, in terms of impacts on ground water, Site F is acceptable. (emphasis added)

45. With respect to impacts on surface water, it is submitted that additional design features, namely a deep perimeter drain as suggested by Mr. Feenstra, are necessary

to make Site F acceptable. Mr. Feenstra suggested that such a drain should intercept the flow in the "active zone" of the Queenston Shale around the southwestern, southern and southeastern parts of Site F. Given the sequence of landfilling proposed at Site F, a perimeter drain serving the same function is logically necessary around Cell 1 as well. Condition 5.6 in the Site F EPA Conditions reflects that necessity.

46. Collection in the "active zone" of the Queenston Shale is necessary with or without the addition of a liner to the Site F design. It is submitted that it is a reasonable finding from all the evidence that 10 - 20 millimetres a year of exfiltration can be expected from the base of Site F without a liner and that approximately 8 millimetres per year exfiltration can be expected with a liner. It is submitted that it has not been demonstrated that a liner is necessary to prevent surface water impacts from Site F.

47. It is therefore submitted that, with the imposition of the conditions set out at Tab 4, Site F can be approved under the Environmental Protection Act and a certificate of approval can be issued." (Summary of Final Submissions on Behalf of the Ontario Ministry of the Environment by Mr. John R. Tidball, Counsel for the Ministry of the Environment, October 17, 1988, paragraphs 19-22, and 36-47).

The Ministry of the Environment proposed conditions of approval that the Ministry considered sufficient and appropriate to be attached to an approval under the Environmental Assessment Act (Appendix A to this Application) and to a certificate of approval issued to Site F under the Environmental Protection Act (Appendix B to this Application). These conditions are designed to ensure that the Ministry's policies and guidelines would be met, that protection of ground and surface waters in the vicinity of the site would be ensured, that appropriate monitoring would be conducted and that feasible contingency measures were available.

It is important to note that the position of the Ministry of the Environment about the suitability of Site F was that Site F

was suitable for landfilling without the need for any on-site liner. Condition 2.1.3 as contained in the Ministry's proposed conditions (Appendix B) is deliberately in square brackets as a matter regarding which the proponent would be required to submit detailed design, operations and monitoring documents to the Approvals Director for approval. This was intended to indicate that the Ministry considered a liner unnecessary at Site F:

[2.1.3 A description of liner construction activities and quality control measures.]

Counsel for the Ministry of the Environment explained the Ministry's position on the need for a liner at Site F as follows:

"In my submission, I don't think the evidence is strong before you that a liner is necessary to serve that function [to reduce exfiltration from the site] and I think I join with Mr. Hodgson [Counsel for the Region of Halton] on that point, from the point of view of collection of ground water from the active zone. I don't think it has been demonstrated that a liner is necessary and it is a redundancy, something you could require at this site and you will have to exercise your judgment on it but, in my submission it is unnecessary." (Transcript Volume 180, October 18, 1988, page 44619 to page 44620)

With respect to the bracketed reference to a liner in proposed Condition 2.1.3, Counsel for the Ministry of the Environment indicated that:

"In 2.1.3 you will notice at Site D the words are the same: 'a description of liner construction activities and quality control measures', and at Site D we have it in there as a regular point and at Site F you will see it is in there with square brackets. That is simply in there and is not there to reflect any submission and in fact it's contrary to my submissions. You will recall the Ministry thinks that a

liner is required [at Site D but not at Site F] and we put it there because if the Board thinks the liner is required [at Site F] it is there for your purposes and it fits there naturally and if in the Board's view the liner is not required, you can simply strike it out." (Transcript Volume 180, October 18, 1988, page 44630)

2. With Respect to the Hydrogeologic Suitability of Site F
With a liner

It is respectfully submitted that the finding of the Joint Board that a liner at Site F would not make the site hydrogeologically suitable because of concerns about its integrity is completely unfounded on any expert evidence at the hearing, and is directly contrary to evidence received by the Board in response to concerns raised by Board member, Dr. Kingham regarding this very issue. It is submitted that for this reason alone, this finding of the Joint Board must properly be rescinded.

The Board's finding in this regard is based expressly on the statement in the Board's decision that Mr. Crutcher (a civil engineer with expertise in landfill design called on behalf of the City of Burlington, which was in opposition to landfiling at Site F); "... could not guarantee that a liner would not become fractured as a consequence of being laid down over different areas of intact bedrock and filled river valleys." (Decision, page 109)

(a) The Evidence of the Experts

In fact, Mr. Crutcher, in response to this concern of Dr. Kingham's, stated quite the opposite. Dr. Kingham first raised this concern at the conclusion of 30 days of evidence given by Mr. Crutcher and his colleague, Mr. Petrie, from the firm of Conestoga Rovers and Associates (CRA). Mr. Petrie was providing his final summary of his and Mr. Crutcher's evidence as to why they felt that a liner at Site F was a "feasible alternative" to make Site F "environmentally sound" (Transcript, Volume 135, page 32600), and "environmentally secure" (Transcript, Volume 135, page 32601), notwithstanding their initial position that the site as designed by the Region without a liner was not suitable:

"Dr. Kingham: Do you know of any case where an attempt has been made to put a liner on an incline on two different base materials and the liner has survived?

Mr. Petrie: I do not and could not speak to that.

Mr. Crutcher: If I may add, I hope to be able to address that a bit more in the operations portion."
(Transcript, Volume 135, page 32600)

NOTE: Transcript pages 32598 to 32601 included in Appendix C to this Application.

Mr. Crutcher returned to give evidence on design and operations considerations two weeks later and during his description of how a liner at Site F would be constructed, gave the following evidence:

"The liner would then be placed and it would be placed under the direction of a geotechnical engineer such that it would maintain integrity or placed with an integrity of K (hydraulic conductivity) less than 1×10^{-8} (cm/sec)."
(Transcript Volume 142, page 34394)

Counsel for the City of Burlington then asked Mr. Crutcher to respond to the question asked two weeks earlier by Dr. Kingham:

"Q. ...I want to ask you to go back to the question that I guess Dr. Kingham put to you when you were here on the hydrogeology panel, to comment upon the aspects of whether or not such a liner can be placed on this native shale bedrock or backfill without any problems with respect to settlement or anything of that nature.

A. I answered, I was a little surprised by Dr. Kingham's question on dealing essentially with the settlement of the liner in the valleys because at that time I had not really considered it as a particularly major issue, but I didn't feel I could answer that without proper consideration.

So, I went back to our geotechnical people at the firm and posed that question to them."

Mr. Crutcher continued his answer on page 34399 as follows:

"...The calculations indicated that settlement would be anywhere from 55 to 75 millimetres...so there will be a very slight dip in the liner, or conversely you can overbuild that area by that very small amount.

...The settlement or the effect of a two to three-inch settlement on the liner, the thought is that that would not even be measurable and the clay itself has a certain plasticity and in fact, it will bend. We did not foresee any problems itself."

Mr. Crutcher concluded his answer to Dr. Kingham with the following statement:

"...once the site is pregraded essentially to the grades as presented by Mr. Hiraishi, the liner placement is rather straightforward and standard engineering practice and the integrity of the liner, you can have a high assurance on the integrity of the liner and we have, in addition, the ability to monitor that for verification purposes."

NOTE: Transcript pages 34397 to 34401 are included in Appendix C.

Dr. Kingham did not pursue the matter any further with Mr. Crutcher. However, the issue arose again during evidence called in reply by the Town of Milton. The Town called Mr. Brian Gray, an experienced geotechnical engineer to address certain geotechnical issues relating to the construction of a liner at Site F.

Dr. Kingham again raised his concern with Mr. Gray. A series of questions and answers ensued between Dr. Kingham and Mr. Gray over ten pages of transcript. The highlights are excerpted below. The full text of those pages can be found in Appendix C. It is submitted that Dr. Kingham's concerns were conclusively answered by Mr. Gray's evidence which confirmed Mr. Crutcher's earlier evidence on this topic.

"Dr. Kingham: Mr. Gray, I just have one question for you and it is really very much on the lines of the question I asked Mr. Crutcher.

...

Mr. Gray: ...It is something that if there is proper attention given to the design dovetailing the transition zones, you don't normally have a settlement problem if you have got strict quality control and your benchmark is high enough, like the 95 per cent Proctor density.

If that can be achieved, then the settlement isn't really an issue.

Dr. Kingham: ...Do you have any concerns about the plasticity of the material under that loading at the bottom side of the landfill?

Mr. Gray: No, in fact, the moisture really is added to facilitate compaction, to facilitate density and permeability to have a low level of permeability.

...
Dr. Kingham: ...Do you, as a geotextile expert, have any concerns about slumping or other deformation of the material now which is saturated and lying beneath that great mass of refuse?

Mr. Gray: ...If there is the quality control during the placement of the shale, it will be dense enough and strong enough that it will be virtually incompressible relative to the loads that are on top of it. It wouldn't give, induce settlement.

...
RE-EXAMINATION BY MR. ESTRIN:

Q. Mr. Gray, dealing, first of all, with the question from Dr. Kingham, I wonder if we can go at that again to the extent we can address it in another way.

...
Dr. Kingham: I think you are trying to answer the question and Mr. Estrin is very helpfully trying to state it clearly, but I think you still haven't got it. We are not talking about void space here. We are talking about the analogy between wet cement and hardened cement.

If you fill the river valleys with hardened cement and put garbage on top, you would not expect that cement would ooze out of the bottom of the river valleys.

If you filled it with wet cement and were instantly able to put 1,000 tons of garbage on top, you would expect to squeeze all of that cement out of the river valley. Where does your remoulded shale fit into that spectrum between something that will slump out under the weight of the garbage and something that will remain absolutely fixed under the weight of the garbage.

Mr. Gray: It is very close to the far end of the scale where things are fixed. It just doesn't have that moisture content to flow as a toothpaste type material.

Dr. Kingham: Thank you, Mr. Estrin. That is what I think we looked for in the first set of questions.

Other geotechnical and landfill design engineers also testified at the hearing about the possibility of installing a liner at Site F: Mr. J. Hiraishi for the Region of Halton and Mr. Paul Bowen for the West Burlington Citizens' Group (opposed to the use of Site F for landfill). No concern was expressed in their evidence that there might be differential settlement or any other geotechnical problems which might affect the integrity of a liner at Site F.

In fact, Mr. Bowen supported the conclusion of Mr. Petrie and Mr. Crutcher that a liner was desirable at Site F to reduce exfiltration from the Site (Exhibit WB906).

Notwithstanding Dr. Kingham's concerns, all of the expert evidence was unanimous that a liner at Site F would make the site hydrogeologically acceptable. The issue in debate as the hearing concluded really related to whether or not a liner was required or whether Site F was acceptable without a liner. * *comparison D or F.*
→ *wrong of by Gerard.*

(b) The Submission of the Parties

As previously indicated, the final submissions of Counsel for the proponent Region of Halton on the issue of hydrogeology outlined the outstanding hydrogeological issues at Site F as follows:

"First, on Site F. In my respectful submission, at Site F, all of this evidence comes down to a single question. Does Site F need a liner. At Site F, all investigators agree that the site can be safely used for landfill. The only

outstanding issue between the investigators in my respectful submission, is the question of whether or not Site F needs a liner. The argument all comes down to the degree of engineering required and I propose to focus my attention on Site F on this single question.

There is, of course, a related question. If Site F needs a liner, does it need an \$18,000,000 liner or will a less expensive liner do? Since it is not the case for the Region that any sort of a liner is justifiable at Site F, I do not propose to get into the question of what sort of a liner is appropriate in my argument. It is Mr. Estrin who called the evidence of Mr. Gray and Dr. Rowe to convince you that a gold plated liner is not needed at Site F and I do not propose to get into that dispute for this reason. In my respectful submission, there is no credible evidence before you that a liner is needed at Site F. Let me repeat, there is no credible evidence before you that a liner is needed at Site F. That is, in my submission, there is no evidence that is sufficiently well developed, sound and believable for you to conclude that a liner is appropriate at Site F." (Emphasis added) (Transcript, Volume 177, pages 44007 - 44008) }

The final submissions of Counsel for the Corporation of the City of Burlington also identified the need for a liner at Site F as one of the main issues that remained before the Board.

"I guess at this point I am in a sense saying to the Board, let us stop for a moment and look at what was said with respect to whether a liner should be part of the approval of Site F if that were selected by the Board. The reason, as advanced, as it were, by CRA and by the subsequent evidence for a liner. That is one of the main issues which the Board will have to determine, whether this liner recommendation as put forward in 617 (Exhibit 617) should be adopted or whether it is necessary to make the site hydrogeologically suitable. (Transcript Volume 190, page 47207 to page 47208, emphasis added).

The final reply submissions made on behalf of the applicants herein regarding the liner issue at Site F were as follows:

"Our position is that a liner is not required at Site F on the evidence, but if the Board concludes that it is, then

it is my submission to you that you should require a liner at Site F. In my submission the Board has heard sufficient engineering evidence regarding the concept of a liner depth to approve that conceptual design. If the Board does not believe it has, the Board has the mechanism of deferring that question in the manner that I indicated to you in my submissions in chief.

It is clear on the evidence that other municipalities have quarries or pits with liners as landfill sites. You heard the example of Metropolitan Toronto, you heard the example of the City of St. Catharines. You have also heard that Halton is fiscally sound. It is my submission that other municipalities find themselves in the position of being able to afford lined sites. I don't believe there is sufficient evidence for you to conclude that Halton cannot. I think you should keep in mind in that regard that the whole liner would not need to be installed all at once, or in fact paid for all at once at the beginning of the landfilling.

The beginning of the area could be lined, the price for that would be substantially lower, in my submission, than the price for the whole liner. As you have heard this is a self-supporting industry, if you like, in Halton in the sense that the entire costs of the waste disposal system are paid for at the gate, and if the liner is necessary at Site F the initial costs can be borne in my submission. Subsequent costs can be paid for by whatever adjustments to the tipping fee are necessary without there being any unreasonable burden on the taxpayers in the Region of Halton.

In my submission a conclusion that a liner is necessary at Site F is not a sufficient reason for concluding that my clients should be expropriated from their homes and properties against their will. In my submission your choice is not between a site at F and a site at D, but your choice, in my submission, in practical terms, is a site at F with or without a liner.

In my submission the evidence is clear that that is the appropriate result one way or the other.

I would also note as perhaps a footnote that I suspect we have spent more money arguing about a liner at Site F at this hearing than it would cost to install one."
(Transcript Volume 193, page 47989 to page 47991)

Counsel for the West Burlington Citizens' Group also made final submission to the effect that if Site F was approved that a condition should be imposed that a liner is necessary. This was argued for on the basis of certainty:

"In regard to the liner issue, it is our submission that if Site F were approved that there should be a condition that a liner is necessary. We have heard evidence about the need for a liner from CRA and Mr. Bowen. The major reason for a liner is the fact that with one, one can predict the amount of leachate escaping from the shale. Presently, I think it is fair to say we don't know exactly what the permeability of the fractured zones are at Site F. It will be this permeability that controls the leakage into the shale. This is an uncertainty. The liner gives us some certainty. As well, as the testimony of CRA and Mr. Bowen, there are some comments of Mr. Sobanski that may be relevant." (Transcript Volume 192, page 47682),

"I think my point here is similar to the point I think Mr. McQuaid was making yesterday, that with a liner there is a certainty about what will be leaking out beneath it." (Transcript Volume 192, page 47683)

and;

"The fact is that a liner will provide certainty about the leakage into the shale. This is the point that Mr. Bowen makes in his report in testimony." (Transcript, Volume 192 page 47685)

* No Counsel, for any party at the hearing, argued that a liner could not make Site F suitable as a landfill site. No Counsel for any party at the hearing argued that Dr. Kingham's concern about possible differential settlement of the liner had not been completely and conclusively settled by the evidence of Mr. Crutcher and Mr. Gray. There is absolutely no expert evidence to support the Board's conclusion that a landfill at Site F would be unacceptable, even if designed with a liner. All of the expert evidence leads to the conclusion that Site F would be an acceptable site, in terms of hydrogeological considerations, if it was designed with a liner.

The Ministry of the Environment proposed conditions to be attached to a Certificate of Approval under the Environmental Protection Act which it considered would ensure that Site F was a safe and environmentally sound landfill site. Those conditions (See Appendix B) contained a proposed Section 5.4 designed to ensure that geotechnical considerations referred to by the expert witnesses, Crutcher and Gray, were properly addressed in the preparation of Site F for landfilling:

"5.4. In areas where valleys are to be infilled, valley wall slopes shall be cut back to a maximum of 3:1 and fill materials shall be compacted to a minimum densite of 95% Standard Proctor." (Summary of Final Submissions on Behalf of the Ontario Ministry of the Environment by Mr. John R. Tidball, Counsel for the Ministry of the Environment, October 17, 1988, page 9).

It is submitted that the only available conclusion that can be reached on the evidence that was before the Board is that Site F would be a suitable landfill site, if not as designed as proposed by the Region, then certainly with a liner.

(c) Implications for Future Landfill Sites in the Province of Ontario

The Joint Board has created and applied new policy in concluding that Site F is "hydrogeologically unsuitable" for landfilling, even if designed with a liner suitable to the Director of Environmental Approvals of the Ministry of the Environment.

The Ministry of the Environment has recent and comprehensive official policies which set out the criteria which a landfill site must meet to be considered acceptable in the Province of Ontario. Those policies were outlined to the Joint Board in the Evidence of Dr. George M. Hughes, Supervisor, Land Disposal Technology Unit, Waste Management Branch, Ministry of the Environment and the position of the Ministry regarding the compliance of both Sites F and D was outlined to the Board in the final submissions by Counsel for the Ministry (reproduced above).

Notwithstanding the Ministry's "Reasonable Use Policy" which is applied throughout the Province of Ontario to determine the hydrogeological acceptability of landfill sites, and notwithstanding the fact that there was not a single expert witness for any of the parties who expressed the opinion that Site F with a liner would not meet that policy, the Board found that Site F, even if so engineered, was unacceptable hydrogeologically.

Implicitly, the Board found that the "Reasonable Use Policy" of the Ministry of the Environment was inadequate or inappropriate for judging the hydrogeologic acceptability of Site F with a liner and, by implication, for judging the hydrogeologic suitability of other landfill sites which are not designed to contain and collect 100% of the leachate generated by the site.

This principle, if applied across Ontario would render unacceptable the vast majority of present landfill sites and rule out every future landfill that was not designed as a hydraulic trap (the design of Site D). As the Board's Decision notes about the hydraulic trap design, "...society is just now exploring such concepts in favour of environmental preservation..." (Decision, page 118). Hydraulic trap designs depend upon the continued functioning of engineered leachate collection systems throughout the entire contaminating life of the site to keep groundwater flowing into the site, rather than away. The design concept is new; there is no experience with operating such landfills in Ontario.]

NOT true → Seymour

The Ministry's Reasonable Use Policy recognizes that it is environmentally acceptable to rely on the natural ability of the environment to attenuate leachate that moves away from a municipal landfill site as long as the reasonable use of ground water in the vicinity of the site is not impaired. This is similar in principle to the way in which contaminants from a septic system are attenuated by the environment as they move away from a tile bed.]

The Board's rejection of this principle which is embodied in the official policy of the Ministry of the Environment, imposes a standard for acceptability on Site F which will be impossible to meet in most locations in Ontario. (All landfill sites, even those with liners, allow the escape of leachate, unless they are designed as a hydraulic trap.)

It is submitted that it is unreasonable, impractical and unnecessary to impose this standard of acceptability on Site F. According to the Ministry of the Environment, Site F would meet the policies of the Ministry even without a liner, and no expert witness for any party at the hearing expressed the opinion that Site F with a liner would fail to meet Ministry policy. All experts at the hearing agreed that there was no risk to public health or safety from either the existing landfill sites on either side of Site F or from the establishment of a new landfill site at Site F, even without a liner.

It is respectfully submitted that the Ministry of the Environment policy regarding the hydrogeologic acceptability of landfill sites is environmentally appropriate and should be the measure of acceptability at Site F in the same way that every other landfill in the province is evaluated. It is respectfully submitted that the Board erred and misunderstood its function in creating and applying its own, different criteria for hydrogeologic acceptability.

3. Resource Policy Issues and Government Policy

It is respectfully submitted that the Joint Board erred in its evaluation of Resource Policy issues by not giving appropriate recognition to the status of the Foodland Guidelines, 1978 as Official Government of Ontario Policy and by failing to give appropriate weight to the positions expressed by the

Ministry of Natural Resources and the Ministry of Agriculture and Food. It is further submitted that Government Policy as reflected by the Parkway Belt West Plan was not given sufficient weight by the Board.

(a) Position of the Ministry of Agriculture and Food and the Foodland Guidelines

The Foodland Guidelines (Exhibit M114) state on their cover that they are: "A policy statement of the Government of Ontario on planning for Agriculture" and contain the provincial coat of arms and the words "Government of Ontario". The introductory remarks by then Minister of Agriculture and Food, Mr. Bill Newman, state that "these Guidelines were first released in February, 1977 as a discussion paper for municipalities, individuals, and groups interested in the role of agriculture in the planning process. The comments received have led to a revision of the Guidelines, which are now being released as a statement of Government policy." (1978) (Emphasis added)

Site D is prime farmland, actively used for agricultural purposes in the middle of an agricultural community which was considered by all witnesses to have long term viability for agriculture in the Region of Halton. Site F is not farmland, nor is it in an agricultural community.

The Board heard evidence from two qualified agricultural experts, Dr. MacIntosh for the Region of Halton and Mr. Hoffman for the Town of Milton, who both agreed as a result of their work that Site D and vicinity had long-term viability for agriculture in the Region of Halton. The Board also heard from Mr. Norm Biggar, President of the Halton Federation of Agriculture and from a number of professional farmers who farm the lands on and around Site D.

Not one qualified agricultural expert witness or one professional farmer gave evidence that would support the Board's finding that "because of speculative pressures there is very little, if any, agricultural profitability in this area."

(Decision, page 38)

In fact, the Board heard that a number of full time farmers including a registered Holstein dairy farmer, a registered Polled Hereford cow/calf operation and a number of cash croppers all make a living farming on or immediately abutting Site D.

(Transcript, Volume 99 and Volume 100)

In these circumstances, it is submitted that the Foodland Guidelines, as applicable Government of Ontario Policy should direct the landfill use to Site F rather than Site D unless it can be demonstrated that Site F "cannot be used".

Section 3.13 of the Foodland Guidelines states as follows:

"Where high capability agricultural lands have been identified, the use of these lands for productive agricultural purposes must be given priority in evaluating alternative uses. If the land is to be used for another purpose, the requirement must be justified. The need for the alternative use within the municipality or planning area must be documented, as must the reasons why lower capability or marginal land cannot be used". (Emphasis added)

It is submitted that if Site F is hydrogeologically suitable, with or without a liner, according to the policies and position of the Ministry of the Environment, that it is contrary to Government Policy as embodied in the Foodland Guidelines to approve Site D and not Site F.

It is submitted that the position of the Ministry of Agriculture and Food, as conveyed in correspondence from the Minister, is consistent with the position that is advanced above. The Ministry of Agriculture and Food made comment throughout the environmental assessment process. The latest written position of the Ministry is set out in correspondence from the Minister, the Honourable Jack Riddell, dated May 20, 1987 (Exhibit MR-579):

"This is further to our recent letter concerning the site selection process for the proposed landfill in the Region of Halton. Staff have been involved closely with the process undertaken under the Environmental Assessment Act to select a landfill. I understand that my staff have stated a preference for the proposed alternative in the City of Burlington which will have considerably less impact on the agricultural resource in the Region. I can appreciate the concerns you have about the proposed alternative in the Town of Milton. A hearing is to be scheduled this year to deal with both alternatives and as I stated, this Ministry's position is that the selected site should be the Burlington Alternative. Thank-you for writing to express your concern." (Emphasis added)

(a) Position of the Ministry of Natural Resources and the Mineral Aggregate Resource Policy

Two aspects of this Ministry's mandate are potentially affected by this decision: mineral aggregate resource concerns and natural area preservation concerns. Site F is in part a licenced but largely unextracted shale quarry. Site F also contains natural vegetation. The Ministry of Natural Resources identified the shale resource as an issue of concern but expressed no concerns about the potential loss of natural vegetation on this site. Site F has not been designated by the Ministry or any other agency as an area that should be preserved in a natural state. It is in private ownership and very disturbed (Evidence of Ms. L. Hellas, Transcript, page 1084) and notwithstanding that it was found to contain vegetation of natural significance, it is submitted that its significance as a natural area is limited and, in any event was not of sufficient importance to be designated for protection by either the Region of Halton or the Ministry of Natural Resources. Both the Ministry of Natural Resources and the Halton Region Conservation Authority were represented by Counsel at the Board hearing and neither expressed any concerns about the potential loss of natural vegetation at Site F.

With respect to its mineral aggregate mandate, Counsel for the Ministry of Natural Resources filed Exhibit MNR-538. This set out conditions of approval for Site F which the Ministry of Natural Resources, the Region of Halton and the owner of the

shale quarry (NSP Investments Limited) all agreed were appropriate to govern the management of the shale resource in the event that Site F was approved for landfill. Those proposed conditions were incorporated as conditions 10(a) and 10(b) in the Conditions of Approval under the Environmental Assessment Act proposed for Site F by the Ministry of the Environment (Appendix A).

The Ministry of Natural Resources was satisfied that the proposed conditions satisfied Government Policy as set out in the Mineral Aggregate Resources Policy, May 9, 1986. As such, it is submitted that the Board's conclusion that the impact on agriculture at Site D was equivalent to the impact on the shale resource at Site F is unreasonable and suggests that the Ministry of Natural Resources was not adequately carrying out its mandate.

(c) Position of the Minister of Municipal Affairs and the Parkway Belt West Plan

Site F is located within the jurisdiction of the Parkway Belt West Plan in the City of Burlington. The Parkway Belt West Plan suspends the application of the City of Burlington Official Plan and Zoning By-law and proposed land uses must instead be in conformity with that Plan.

The Parkway Belt West Plan represents provincial government policy for the appropriate use of lands within the jurisdiction of that plan. On June 24, 1986, after receiving and considering

written submissions from all interest parties, the Minister of Municipal Affairs deemed, pursuant to his authority under the Parkway Belt Planning and Development Act, R.S.O.1980, c.368, as amended, that the establishment of a landfill site at Site F by the Regional Municipality of Halton was in conformity with the Parkway Belt West Plan.

(d) Reasonable Use Policy and the Position of the Ministry of the Environment

It is submitted that the Board's decision to group "Resource Policy Issues" for analysis is incomplete unless one also considers the resource policy issues previously addressed in this application regarding the reasonable use of ground water and the Ministry of the Environment policies that relate to that topic.

It is submitted that the record is clear that the Ministry of the Environment is satisfied that all of its relevant policies would be satisfied and complied with if Site F was used as a landfill site, with or without a liner.

4. Social Impacts

It is submitted that the evidence at the hearing overwhelmingly established that the difference in social impacts that would result from locating a landfill site at Site F compared to Site D is one of the major differences that distinguished the two sites.

It is submitted that the major social impacts that result from a landfill site are experienced by those persons who must be expropriated from their homes and properties and by those persons who are immediately adjacent, or in very close proximity to the site.

The Ministry of the Environment, in its Policy Guideline for Land Use On or Near Landfills and Dumps, considers "...the most significant adverse environmental effects of a landfill to normally occur within 500 metres of the fill perimeter."
(Exhibit MR-580, p.1)

While this is not a strict separation distance, and is subject to modification based on site specific studies, it is submitted that it does provide a usefull scale for assessing the numbers of people likely to be subjected to serious social impacts. Consultants for the applicants herein established equivalent study areas around both Site F and Site D to conduct a comparative evaluation. The study areas at both sites were established to include properties which were:

1. on site,
2. abutting, either directly or across a public road, and,
3. within 500 metres of the area of the landfill judged to potentially generate substantial impact, including the fill area and the site entrance frontage.

(Exhibit MR-580, page 2)

Minor adjustments were made to the study areas at both sites to avoid arbitrary exclusions. In the case of Site F, four properties that were between 530 and 650 metres away were included in the study area.

The social environment within each of these two study areas was documented, as objectively as possible, to provide a comparative measure of the populations at both sites which were most susceptible to serious impacts. The results were:

At Site F:

- No dislocation of households
- No on-site dwellings
- 6 dwellings off-site within study area
(including the 4 added by extending the study area beyond 500 metres).

At Site D:

- 3 households require expropriation
- 1 household may be expropriated (Tomosky)
- up to 10 adults and 3 children would be dislocated by these expropriations
- 3 businesses and 1 airstrip would have to relocate because of these expropriations
- 9 properties expropriated in whole or in part which are presently used for agricultural production
- 22 households, including 42 adults and 22 children, 3 businesses, 3 owner occupied

farms, 7 other agricultural properties and an adjacent airstrip are all within the study area.

The Board notes in its decision that Mr. and Mrs. Watt Martin would be particularly affected by the dislocation of their home and business:

"The family most seriously affected by dislocation at Site D is that of Mr. and Mrs. Watt Martin, who own a 50 acre property on the northern portion of the Site D. The property includes two runways, a hangar and a maintenance building for restoring, repairing and rebuilding antique aircraft. Despite the existence of the two runways, 40 acres of this property are rented out to other persons for farming purposes.

Mr. and Mrs. Watt Martin appeared before the Board and explained that the antique aircraft repair and rebuilding facility provides 75% of the family income. They felt that relocation would take two to three years and would require 50 acres of land. There is no comparable land within 45 miles of the Pearson International Airport and it would be extremely difficult, if not impossible, for them to reestablish themselves. Mr. Martin is 63 years old, in good health, and feels that he can continue his business for another 12 years.

A number of other witnesses, in particular Mr. Anderson, Mr. Davies and Mr. Hems, were called in support of Mr. Martin's business. They said there was nowhere else where this kind of work could be done. It appears that Mr. Martin's services are valuable to some fifteen to eighteen owners of antique aircraft in the southwestern Ontario area."
(Decision, page 22)

Evidence from Mr. A.J. Shortt, the Curator of the National Aviation Museum in Ottawa for 18 years, was that Mr. Martin's services are valuable to a much larger community than the Board indicates in its decision:

"People with Mr. Martin's talents and set-up are rare in Canada. The Museum has only ever used one other outside expert for restoration purposes, and this person operates only as a hobby, not a business. I am unaware of any other person in Canada, other than Mr. Watt Martin, who restores and conserves antique aircraft as a business. The only others that I am aware of only do this work as a hobby.

The closure of Mr. Martin's vintage aircraft restoration and conservation business would be a serious loss to the historic/heritage aircraft community in Canada and to our work at the National Aviation Museum." (Exhibit MR-550, page 2)

It is submitted that the Board's decision treats the serious social impacts associated with dislocating the four on-site families at Site D and their homes and businesses in an inconsistent and unreasonable fashion.

Beyond the study area at Site F, starting at about 750 metres from the site is the residential part of the community of Aldershot. These residential uses are separated from Site F by distance and by intervening uses, including: the North Service Road, Highway #403, a hydro transmission corridor, a CNR rail line, CNR marshalling yards and vacant industrial land. It is submitted that this is as substantial a physical buffer from a landfill site as any person in a modern urban society can reasonably expect. All of the expert witnesses who quantified actual physical impacts from a landfill site at Site F agreed that such impacts on this community would be negligible or non-existent.

Nevertheless, the Board heard from about forty people who lived in that community who expressed fears about the location of a landfill at Site F. (Decision, page 24 to 26)

While the Board finds at page 22 that:

"...although the perception of risk is an important factor in environmental assessment, it ought not to be as significant a social factor as dislocation and other quantifiable physical factors." (Decision, page 22, emphasis added)

The decision goes on to conclude that:

"There would be a serious social impact at both sites. At Site F the impact would be more diffuse and less serious for a large number of people. At Site D the social impact would be severe for a small number of people. The severity of impact would diminish with distance from the site."
(Decision, page 28)

It is submitted that the equation of social impacts at these two sites in this way is unreasonable, unrealistic, contrary to the expert evidence received by the Board on the topic of social impacts, inconsistent with the Board's finding on page 22 and inconsistent with the statement in the Ministry of Environment Guideline that "...the most significant adverse effects of a landfill normally occur within 500 metres of the fill perimeter."

Even Mr. Ian MacNaughten, the expert planner called by the City of Burlington who preferred Site D to Site F for other reasons, conceded that in the category of social impacts, the difference between the social impacts at Site D and the social impacts at Site F was a "major" advantage to landfilling at Site F. (Exhibit B901)

No expert witness testified to the Board that the social impacts at the two sites could be equated in the way that the Board found, or in any other way. (It is submitted that there is no reasonable evidence upon which the Board could base its conclusion that serious social impacts were essentially equivalent at the two sites.) It is submitted that it is unreasonable and offensive to public policy to conclude that "severe" social impacts on fewer people are equivalent to lesser, perceptual impacts on a larger population.

5. Expropriation Issues

It would be necessary to expropriate property, homes and businesses from 4 families against their will if Site D is approved for landfilling. If Site F is approved, no landowners will need to be expropriated against their will. The lands are vacant and both landowners are on record as supporting the use of their lands for landfilling.

Part of the mandate of the Joint Board was to determine if the expropriation of lands at either site was "fair, sound and reasonably necessary in the achievement of the objectives of the expropriating authority" (Expropriations Act, R.S.O. 1980, c.148, s.7(5)).

In this case, the expropriating authority is the Region of Halton, and the Region's objective is to establish a safe and suitable landfill site within its boundaries. After 5 years of

comprehensive study in compliance with the Environmental Assessment Act and other applicable provincial legislation, the Region's team of independent consultants identified Site F as the preferred site for a landfill site. Regional Council considered the recommendation and voted to endorse a marginal preference for Site F. Throughout a lengthy, costly and politically divisive public hearing, the Region's position did not waver - Site F was marginally preferred throughout.

It is submitted that it cannot be fair, sound and reasonably necessary to expropriate 4 families when an alternative exists which is the preferred choice of the proponent which is a politically responsible body, when the preferred alternative is found to be in compliance with all relevant government policies including the Foodland Guidelines, the Mineral Aggregate Resources Policy, the Parkway Belt West Plan and the Reasonable Use Policy of the Ministry of the Environment, when all technical experts agree that use of the preferred alternative presents no risk to public health and safety, with or without a liner, when the Ministry of the Environment is satisfied that the preferred alternative is safe and environmentally suitable for landfilling, when a reasonable analysis of social impacts and planning issues favour use of the preferred alternative, and when the preferred alternative does not require the expropriation of any persons against their will.

It is submitted that expropriation of people against their will is not "fair, sound and reasonably necessary" simply because

two members of the Joint Board consider the preferred alternative to be unacceptable by standards of their own creation which are not in conformity with standards set out in official policy of the Ministry of the Environment which are used to judge the acceptability of landfill sites in every other place in Ontario.

E. CONCLUSION

It is respectfully submitted that a matter as serious as the expropriation of people from their homes, properties and businesses must only be determined on the basis of decisions that are based on a reasonable and objective balancing of the evidence and expert opinion presented at the hearing. It is respectfully submitted that this decision of the Joint Board fails to meet that requirement. It is therefore requested that the Lieutenant Governor in Council grant this application and make the Order requested in Part A of this Application.

All of which is respectfully submitted this
22nd day of March, 1989

A handwritten signature in dark ink, appearing to read 'S. Garrod', is written over a horizontal line.

Stephen Garrod, Counsel for the Applicants

APPENDIX A

PROPOSED CONDITIONS OF APPROVAL ENVIRONMENTAL ASSESSMENT ACT

Site F

1. The Regional Corporation shall make all reasonable efforts to institute programs and activities and to encourage area municipalities to institute programs and activities to promote the re-use, reduction and separation at source and recycling of waste.
2. The Regional Corporation shall make all reasonable efforts to comply with the strategy and timetable for the implementation of an Energy From Waste facility as set out in Part 3 of "Halton Region's Response to the Ontario Government Review of Halton's Environmental Assessment - Solid Waste Management System for the Regional Municipality of Halton-Landfill Component", with the objective of starting up such a facility within 8 years of the first receipt of waste at the landfill site.
3. If 50 percent of the waste generated within the Regional Municipality is not diverted from the landfill site by the end of the eighth year of operation, the Regional Corporation shall immediately commence appropriate waste management studies required for the approval of additional waste reduction, reuse, recycling, recovery and disposal programs and facilities.
4. Within one year of this approval, the Regional Corporation shall make all necessary arrangements to provide facilities for the collection and transfer of household hazardous wastes. Such facilities shall be convenient and available for use by all residents in the Regional Municipality at least once in each month.
5. The Regional Corporation shall establish a Review Committee to monitor waste haulage practices in the Regional Municipality. The purpose of the committee shall be to review public concerns, haulage routes and practices with the goal of improving general traffic safety.

6. The Regional Corporation shall take all reasonable steps to form a Citizen's Advisory Committee to make recommendations for the avoidance or minimization of off-site impacts from the landfill. The Committee shall consist primarily of local residents. The Regional Corporation shall provide a reasonable annual budget to provide for the operation of the Committee.
7. The Regional Corporation shall undertake industrial and commercial waste generator surveys to identify all potential generators of commercial and non-hazardous solid industrial waste and the disposal method of each type of waste. The information in the survey shall be up-dated as appropriate and at least annually. The information in the surveys shall be made available to the operators of the site on a continuous and interactive basis and to the Director of the Central Region of the Ministry of the Environment upon request.
8.
 - (a) Prior to site preparations, the Regional Corporation shall carry out an archeological survey of the site.
 - (b) The Regional Corporation shall either avoid significant archeological sites or conduct salvage operations if avoidance is not possible because of landfilling operations.
9. Prior to any construction activities at the site, the Regional Corporation shall, in cooperation with the City of Burlington, either design and implement measures at Bayview Park to mitigate noise, dust, odour and visual impacts of the landfill site or make provision for replacement facilities during the operation of Cell 1.
10.
 - (a) The Regional Corporation, or its designate, shall maintain, in accordance with the provisions of the Pits and Quarries Control Act

(Ontario) (the "Act") or any successor legislation, the license to extract shale on Site "F" until the filing of the final closure plan in respect of Site "F", providing that, if any future legislative or regulatory provision governing the requirements for maintenance of such a license impose any greater obligation or duty on the Regional Corporation or its designate, as holder of the license, concerning the need to extract or remove shale from the licensed area than are imposed pursuant to the Act as at the date hereof there, at the Regional Corporation's option, this condition and the obligation of the Regional Corporation pursuant to this condition shall terminate.

- (b) The Regional Corporation shall be free, in consultation with the District Manager, Ministry of Natural Resources, Cambridge District or his successor and with the approval of the Director of Approvals of the Ministry of the Environment, to make such modifications from time to time to the Final Design and Operations Plan as to the Regional Corporation seem desirable to accommodate the potential extraction of shale in excess of landfill cover requirements, and its storage on or removal from or both, the area licensed under the Act or any successor legislation for shale extraction. For greater certainty, the Regional Corporation shall not be obliged hereunder to cause to be carried out or to carry out the extraction of shale in excess of landfill cover requirements from the site. This condition is intended to ensure that the Regional Corporation shall have flexibility to make modifications in the future to the Final Design and Operations Plan should such be possible and desirable in the opinion of the Regional Corporation to accommodate such extraction of shale in excess of landfill cover requirements.

- 11. The Regional Corporation shall design and operate the site in a manner that will allow for the implementation of a passive recreational after-use at the site.

12. On or before October 1st of each year, the Regional Corporation shall submit a report to the Director of the Environmental Assessment Branch of the Ministry of the Environment for filing on the public record which describes compliance with these conditions of approval. Copies of the report shall be provided to the District Manager, Cambridge District, Ministry of Natural Resources, the Director, Heritage Branch, Ministry of Citizenship and Culture, the Manager, Electricity Section, Liaison and Planning Branch, Ministry of Energy and the Clerk of the City of Burlington.

(Summary of Final Submissions on Behalf of the Ontario Ministry of the Environment by Mr. John R. Tidball, Counsel for the Ministry of the Environment, October 17, 1988).

APPENDIX B

PROPOSED CONDITIONS OF APPROVAL ENVIRONMENTAL PROTECTION ACT

Site F

Definitions

1.1. In these conditions,

"Approvals Director" means the Director of the Approvals Branch of the Ministry of the Environment or his designate;

"Regional Director" means the Director of Central Region of the Ministry of the Environment or his designate;

"District Officer" means the District Officer of the Halton-Peel District of the Ministry of the Environment;

"the Regional Corporation" means the Regional Municipality of Halton.

"site" means the waste disposal site.

Design and Operations

2.1. The Regional Corporation shall submit detailed design, operations and monitoring documents to the Approvals Director for approval. The documents shall be prepared to reflect conditions 3 to 14 of this approval and conditions of the approval to proceed with the undertaking under the Environmental Assessment Act and shall contain at least the following:

2.1.1. A description of site preparation activities, including

borehole sealing, infill materials and compaction plans and base preparation.

- 2.1.2. A base contour plan.
- [2.1.3. A description of liner construction activities and quality control measures.]
- 2.1.4. Plans and descriptions of the leachate collection systems for both the valley bottoms and site base, including a definition of the maximum permissible leachate mound to prevent leachate break-outs and a description of sewer connections.
- 2.1.5. A description of leachate collection system inspection and maintenance activities.
- 2.1.6. A description and plan of leachate flow measurement locations, facilities and methods.
- 2.1.7. Plans and descriptions of surface water collection and containment structures.
- 2.1.8. A description of daily, intermediate and final cover activities, including depths, material characteristics, installation procedures and storage locations.
- 2.1.9. A description of cover stockpile activities, including use, timing, locations, erosion protection and temporary vegetation measures.

- 2.1.10. A description of methods and procedures to be used in the construction of berms on the outside of each level of waste.
- 2.1.11. Interim and final contour plans.
- 2.1.12. Plans and descriptions of site roads.
- 2.1.13. A landscape plan describing the locations of interim and permanent vegetation, including types, sizes and planting schedules, and earthen, vegetative or other types of barriers for the purpose of providing windbreaks and mitigating visual impacts from the site.
- 2.1.14. A description of daily operating activities.
- 2.1.15. A description of litter control activities on and off the site.
- 2.1.16. Plans and descriptions of site fencing.
- 2.1.17. A description of piped water facilities.
- 2.1.18. Plans and a description of a storage facility for suspect wastes.
- 2.1.19. A description of vector control activities.
- 2.1.20. A description of any gas monitoring activities.
- 2.1.21. A ground water monitoring program.

- 2.1.22. A surface water monitoring program.
- 2.1.23. A leachate monitoring program.
- 2.1.24. A description of contingency plans to mitigate impacts from leachate or gas migration.
- 2.2. The Regional Corporation shall construct and operate the site and carry out monitoring activities and programs in accordance with the design, operations and monitoring documents as approved by the Approvals Director and with any modifications as may be approved from time to time by the Approvals Director.
- 2.3. No activity for which approval of the Approvals Director is required under condition 2.1 shall be carried out without that approval.
- 2.4. As built surveyed drawings shall be submitted to the Approvals Director for all facilities, including base contours, leachate collection facilities, final cell contours and elevations, berms and monitoring installations, together with certifications from appropriately qualified persons that the facilities have been completed in accordance with the approved design.

Inspection and Control of Waste

- 3.1. Only 7.96 million cubic metres of domestic, commercial and non-hazardous solid industrial waste may be deposited at the site. In no case shall any hazardous or liquid industrial waste be deposited at the site.
- 3.2. The Regional Corporation shall establish a comprehensive system of incentives and penalties to enforce compliance with site operating

rules by users and to ensure to the greatest extent practicable that only permissible waste is deposited at the site.

- 3.3. Prior to any receipt of waste at the site, the Regional Corporation shall establish a computerized record-keeping system at the site to continuously record details of the following information with respect to each load of waste to be landfilled at the site:

- 3.3.1. sources of waste by generator;
- 3.3.2. waste types;
- 3.3.3. weight;
- 3.3.4. hauler name;
- 3.3.5. hauler certificate of approval number;
- 3.3.6. driver identification;
- 3.3.7. infractions of site operating rules; and
- 3.3.8. disposal location.

- 3.4. Condition 3.3 does not apply with respect to waste received at the public container area, but does apply to waste transferred from the public container area to the disposal area.

- 3.5. Prior to any receipt of waste at the site, a storage facility with appropriate environmental protection measures shall be established at the site to safely hold and contain any suspect wastes requiring either confirmation of suitability for disposal or removal and disposal

at an alternate approved facility. Appropriate equipment shall be maintained on-site to immediately load and remove suspect wastes from the working face to the waste holding area.

3.6. Prior to the commencement of site preparation, the Regional Corporation shall retain a full-time Environmental Inspector who shall be responsible for:

- 3.6.1. monitoring compliance with these conditions,
- 3.6.2. monitoring the installation of all works and ongoing site management and operations throughout the life of the site,
- 3.6.3. reporting all incidents of non-compliance with the regulations, these conditions, the conditions of approval under the Environmental Assessment Act and the approved design, operations and monitoring documents,
- 3.6.4. reviewing the raw data associated with all groundwater, surface water and gas monitoring and reporting to the Regional Director on any data which indicate actual or potential contaminant movement,
- 3.6.5. preparing written inspection reports for submission to the Regional Director on a monthly basis, or more frequently as required by the Regional Director,
- 3.6.6. preparing an annual report for submission to the Regional Director summarizing his or her activities and findings, and

- 3.6.7. participating on the Citizen's Advisory Committee.
- 3.7. Detailed terms of reference concerning the activities and responsibilities of the Environmental Inspector shall be submitted to the Regional Director for review and approval no later than 2 months after the date of this approval.
- 3.8. The Regional Corporation shall employ at least one properly trained waste inspector to exclusively monitor the dumping of all waste at the working face.
- 3.9. The Regional Corporation shall employ traffic controllers to supervise the movement of vehicular traffic at both public disposal areas and at the working face.
- 3.10. Once in each month during the first year of site operation and annually thereafter until closure, the Regional Corporation shall arrange for an inspection of the site by a pest control contractor. The annual inspection shall be increased to a monthly frequency if pest control problems occur. Records of inspections shall be maintained at the site office.

Surface Water

- 4.1. Surface water collection and containment structures shall be designed to,
 - 4.1.1. maintain the naturally existing catchment area of Indian and Falcon Creeks;
 - 4.1.2. convey, at a minimum, the fifty year design storm with

erosion control protection up to the five year storm condition;

4.1.3. ensure that there are no increases in post-development flow rates over pre-development flow rates for a range of storms up to and including the one in one hundred year storm;

4.1.4. prevent any potential increase in erosion along the Indian Creek should any changes in flow result from the final design; and

4.1.5. ensure that potential discharges of leachate to surface water can be contained and, if necessary, immediately discharged to an appropriate treatment facility.

4.2. Surface water storage facilities shall have the capability for storing surface water for at least 48 hours under average annual flow conditions.

4.3. Surface water collection and containment structures shall be designed using the appropriate computer modelling method of hydrological and hydraulic calculations as specified in "Flood Plain Management in Ontario, Technical Guidelines, Ministry of Natural Resources" and "Storm Water Management Guidelines, Central Region, Ministry of Natural Resources".

4.4. All surface water storage areas shall be inspected at least once in each year and dredged as required.

Site Preparation

- 5.1. Prior to any excavation at the site, all boreholes and any other conduits for possible leachate movement within areas of landfilling shall be properly sealed.
- 5.2. Schedules for the construction and installation of site facilities shall be provided in advance to the District Officer.
- 5.3. Prior to base preparation, a leachate collection system shall be constructed on the floor of the valleys, as shown conceptually on Drawing 5-r of the "Site F: Design and Operations Report, September 1986", prepared by Trow Hydrology Consultants Limited.
- 5.4. In areas where valleys are to be infilled, valley wall slopes shall be cut back to a maximum of 3:1 and fill materials shall be compacted to a minimum density of 95% Standard Proctor.
- 5.5. The leachate collection system to be constructed on the base of the site shall be designed and operated to,
 - 5.5.1. provide for a slope on all collectors and headers that will minimize clogging;
 - 5.5.2. maintain the leachate heads within the waste at levels that will not cause leachate break-outs to the ground surface; and
 - 5.5.3. provide maximum possible access to collectors for routine inspection and maintenance.

- 5.6. Drains and, if necessary, purge wells shall be constructed at or beyond the limits of fill around the southern, southeastern and southwestern perimeter of both cell 1 and cell 2 to intercept ground water flow in the active zone of the Queenston shale.
- 5.7. Connections shall be made to the regional sanitary sewer and water supply systems prior to the receipt of any waste at the site.

Roads

- 6.1. All site roads, except those located on areas that are to be landfilled, shall be paved and shall be cleaned on a daily basis when in use.
- 6.2. All non-paved site roads shall be treated with dust suppression materials as required in order to minimize dust generation.

Equipment

- 7.1. All off-road equipment used at the site shall not be operated in a manner which exceeds a sound level of 85 decibels at 15 metres measurement distance.
- 7.2. All off-road equipment shall be tested annually for sound levels in accordance with the procedures specified in Publication NCP-115 of the Ministry of the Environment's Model Municipal Noise Control By-Law.
- 7.3. Equipment shall be maintained to minimize downtime.

General Operations

- 8.1. Prior to the commencement of landfilling in each level of waste above grade, a compacted berm of cover material shall be placed at the fill perimeter to the maximum anticipated height of waste in that level. A layer of material with a permeability greater than 1×10^{-3} cm/sec shall be placed on the interior side of the berm, extending onto the floor of the level, to ensure a positive hydraulic connection with the level below.
- 8.2. Waste shall be deposited in a manner that minimizes the size of the working face and shall be compacted before cover material is applied.
- 8.3. Cover material with a material size no greater than 25 millimetres shall be applied in a layer at least 15 centimetres thick over newly deposited and compacted waste at the end of each day that the site is open in a manner that ensures that no waste is exposed.
- 8.4. Cover material shall be applied so that vertical hydraulic connection is maintained in each cell.
- 8.5. An alternative supply of cover material for at least five working days shall be maintained at the site at all times and used when regular daily cover materials cannot satisfy conditions 8.3 and 8.4.
- 8.6. Additional cover material shall be applied in a layer at least 15 centimetres thick in areas where no further waste is to be deposited for 60 days.

- 8.7. Whenever any part of a fill area has reached its limit of fill, final cover material shall be applied and compacted. The compacted cover material shall be at least one metre thick.
- 8.8. Cover material which has cracked or eroded so that waste is exposed shall be immediately regraded and compacted.
- 8.9. Soil stockpiles shall be located such that impacts on rare plants are minimized.
- 8.10. Surface ponding of water shall be minimized.
- 8.11. Grass on finished or temporarily stabilized areas shall be maintained at a minimum height of 12 centimetres to discourage bird loafing.

Public Containers

- 9.1. The public container area shall be screened from the North Service Road.
- 9.2. Each bin in the public container area containing waste at the end of an operating day shall be closed or covered overnight.

Litter Control

- 10.1. The Regional Corporation shall take all necessary steps to prevent the egress of litter from the site.
- 10.2. Litter shall be recovered as soon as possible and, in any event, within 24 hours.

- 10.3. In addition to the provisions of condition 10.2, litter shall be picked up at least weekly from the following roads and ditches in the vicinity of the site:
 - 10.3.1. North Service Road between Waterdown Road and Brant Street.
 - 10.3.2. King Road between North Service Road and the base of the escarpment.
- 10.4. Permanent fencing to be installed at the site shall be chain link and a minimum of 3.5 metres in height.
- 10.5. Temporary fencing to be installed at the site shall be portable and a minimum of 3.5 metres in height.
- 10.6. Temporary or permanent fencing shall be placed around all tipping areas, except that snow fencing may be utilized within 30 metres of and parallel to the west edge of the active fill area.

Landscaping and Vegetation

- 11.1. In areas of the site not to be used for landfilling and in areas which have received final cover, every effort shall be made to encourage natural vegetative succession in order to facilitate a passive recreational after use of the site. In particular, the following activities shall be undertaken:
 - 11.1.1. Existing woodlots and hedgerows on site boundaries shall be preserved, where possible.

- 11.1.2. Vegetative linkages between the remaining vegetation, the closed Burlington Landfill Site and the Sassafras Woods ESA shall be preserved and encouraged where possible.
- 11.1.3. Individual provincially and regionally rare plants shall be transplanted, where appropriate, to similar habitats on or off site.
- 11.1.4. Those parts of the fill area to be planted in meadow species shall be covered with at least .5 metres of topsoil, over and above final compacted cover.
- 11.1.5. Those parts of the fill area to be planted in woody species shall be covered with at least 1 metre of topsoil, over and above final compacted cover.
- 11.1.6. Natural vegetation in areas adjacent to the landfill shall be encouraged to move onto the landfill area.

Ground Water Monitoring

- 12.1. The ground water monitoring program shall be designed to identify, delineate and characterize any movement of landfill-derived contaminants. The program shall be designed in accordance with the following:
 - 12.1.1. New well nests shall be established along the southwest, southern and southeast boundaries of the site and, where possible, shall be located and designed for contingency purge well purposes. At least two new

background wells shall be constructed upgradient of the site.

12.1.2. Each new well shall be installed in a separate borehole. No multilevel devices shall be employed.

12.1.3. The deepest borehole at each monitoring location shall be continuously sampled and cored during drilling. All boreholes shall be drilled using a technique that minimizes the introduction of foreign water into the substrata.

12.1.4. Packer testing shall be conducted along the entire length of the deepest borehole at each well nest location to identify the most transmissive zones. Well screens shall be installed opposite fractures or fracture zones to intercept groundwater moving through discrete vertical intervals.

12.1.5. Pumping tests shall be conducted to investigate the lateral and vertical connection between fractures intercepted by the new monitoring wells.

12.1.6. New wells are to be constructed with regard to the detection of volatile organic compounds. In particular, well casing material shall be constructed of stainless steel which has been steam cleaned at the borehole site. A sample of the rinse water shall be analyzed to confirm the absence of contaminants.

12.1.7. A monitoring well network, consisting of new wells and appropriate existing wells, shall be established. Existing

wells shall not be used for the detection of trace organic contaminants.

- 12.1.8. Each monitoring well shall be equipped with a dedicated sampling device. Sampling devices and techniques shall be designed to provide representative samples and to ensure sample integrity.
- 12.1.9. Each well in the monitoring well network shall be sampled over a period of at least one year to characterize baseline water quality and to establish representative tritium and chloride levels to more accurately define the zone of active ground water flow in the Queenston shale.
- 12.1.10. Sampling and analytical procedures, including quality assurance and quality control activities, shall be documented.
- 12.1.11. A ground water sampling program shall be developed to ensure early detection of contaminants which have escaped the landfill. Ground water shall be sampled at least twice per year with more frequent sampling along contaminant pathways consistent with ground water velocities and estimated arrival times for contaminants. Parameters for analysis shall include a suite of organic compounds characteristic of leachate generated at the site. Sampling frequency and parameters for analysis shall be adjusted as monitoring information becomes available.

- 12.1.12. Equilibrium water levels shall be measured in all wells in the ground water monitoring network prior to the collection of each sample.
- 12.2. The results of all analyses shall be provided to the Environmental Inspector within one month of each analysis being completed.

Surface Water Monitoring

- 13.1. The surface water monitoring program shall be designed to identify any movement of landfill-derived contaminants to surface water. The program shall be designed in accordance with the following:
 - 13.1.1. Permanent surface water monitoring stations shall be established along surface water courses on the site and between the site and Burlington Bay. Stations shall be located, where possible, to avoid other sources of contamination.
 - 13.1.2. Shallow wells for the monitoring of ground water discharge to surface water shall be installed adjacent to each station.
 - 13.1.3. Surface water at each station and ground water from each shallow well shall be monitored once in each month. Frequency shall be increased in the event that landfill-derived contamination is suspected.
 - 13.1.4. Where possible, surface water sampling shall be coincident with ground water sampling.

- 14.5. Equilibrium leachate levels shall be measured in each well installed in the waste prior to sample collection and at the same time as equilibrium water levels are measured in the groundwater monitoring network.

Contingency Plans

- 15.1. If, in the opinion of the Regional Director, monitoring or other information identifies any unacceptable impact from leachate or gas migration, the Regional Corporation shall immediately take all necessary steps to implement contingency plans.

Staff Training

- 16.1. Prior to any receipt of waste at the site, the Regional Corporation shall prepare a manual of practices and procedures for landfill staff use and reference. The manual shall be updated and improved as required. A copy of the manual and any updates shall be provided to the Regional Director.
- 16.2. The Regional Corporation shall implement a regular training program for all landfill staff.

Annual Report

- 17.1. The Regional Corporation shall submit an annual report to the Regional Director covering each calendar year. Each report shall include the following information:
- 17.1.1. The raw data and an interpretive analysis of all monitoring programs.

- 17.1.2. A yearly summary of volumes and weights by type of all wastes received at the site including a list of all vehicles refused entry to the site together with reasons for any refusal.
- 17.1.3. Any environmental and operational problems encountered during the operation of the site and any mitigative actions taken.
- 17.1.4. A description of the quality and quantity of the leachate collected and discharged to the sanitary sewer system.
- 17.1.5. An assessment of the operation and performance of all leachate collection facilities.
- 17.1.6. The results of all routine inspections of the leachate collection facilities.
- 17.1.7. A statement as to compliance with all conditions of approval and with the inspection and reporting requirements of the conditions.

Closure

- 18.1. At least two years before closure of the site, the Regional Corporation shall submit a complete plan for the closure, long term maintenance, long term monitoring and after use of the property to the Regional Director. The plan shall include:
 - 18.1.1. Plans for fencing and access control.

- 18.1.2. Details of any additional cover.
- 18.1.3. Details of any additional vegetative cover.
- 18.1.4. After use plans.
- 18.1.5. Plans for continued monitoring of the leachate collection system, surface and ground waters and gas.
- 18.1.6. Plans and schedules for routine inspection and maintenance of the site after closure.
- 18.1.7. Updated contingency plans to mitigate any impacts from leachate or gas migration.

Land Ownership

- 19.2. Prior to the receipt of any waste at the site, this certificate, including the reasons for these conditions, shall be registered by the Regional Corporation as an instrument in the appropriate Land Registry Office against the title of the site and a duplicate registered copy thereof shall be returned by the Regional Corporation to the Director.
- 19.3. No part of the site shall be conveyed prior to or after closure of the site to any person by the Regional Corporation or any transferee from the Regional Corporation without the prior approval of the Director.

(Summary of Final Submissions on Behalf of the Ontario Ministry of the Environment by Mr. John R. Tidball, Counsel for the Ministry of the Environment, October 17, 1988).



1 DR. KINGHAM: Can we understand that in
2 terms of the chloride profiles here that below the red
3 line is essentially old water geologically?

4 MR. PETRIE: We can understand that.

5 DR. KINGHAM: Above the blue line is
6 relatively fresh water?

7 MR. PETRIE: Recognizing that as water
8 exfiltrates from a landfill at the site and moves
9 generally downslope, it is going to pick up more
10 mineralizations as it flows and the chloride levels
11 would increase from left to right and the water would
12 still be modern in the general sense.

13 In consideration of all I have learned
14 from the new data provided since I have been here and
15 the additional interpretations considered, in my mind
16 the site is poorly defined and I feel it cannot be
17 easily monitored and I cannot make predictions
18 regarding the rate and patterns of contaminant
19 migration that may occur at this site and with respect
20 to the criteria we developed on hydrogeologic
21 suitability, I believe Site F is not hydrogeologically
22 suitable.

23 Now, we considered an alternative
24 landfill design of a clay liner and that clay liner
25 would consist of a lower sand blanket, a clay liner



1 itself and then a sand blanket and leachate collection
2 system on the upper side of the liner and the refuse
3 would be deposited above that again. We believe that
4 that liner is a feasible alternative in order to make
5 the site environmentally sound. It does in our mind
6 give us greater confidence with respect to prediction
7 and we have a greater capacity to monitor. We can
8 monitor the sand blanket directly beneath the liner for
9 a compacted, installed clay liner and we would have an
10 understanding of its properties, its porosity and
11 hydraulic conductivity, and would be able to make
12 predictions regarding the rate of diffusion or the rate
13 of contaminant transport through that liner and have a
14 reasonable handle on the capacity for that liner to
15 provide attenuation. Given that we can monitor the
16 base of the liner, it provides us the capacity to
17 monitor the site. Two questions or two points were
18 raised during cross-examination regarding the liner and
19 these we feel are design issues. One relates to the
20 position of the water table vis-a-vis the liner and if
21 the liner is at -- if the water table is at the base of
22 the liner we have calculated one hydraulic gradient
23 across that liner and if the water table is at the top
24 of the liner we have a different hydraulic gradient
25 across that liner. Thus the position of the water



1 table with respect to the top of the liner is yet to be
2 evaluated and we feel is a design issue respecting the
3 design of a liner.

4 The second issue raised is the
5 geotechnical considerations with respect to installing
6 a compacted clay liner on one part on rock, and that
7 would be the portion of the rock which would be removed
8 so you would be dealing with a more fresh rock surface
9 and, secondly, the clay liner to be installed on
10 infilled material, infilled into the stream fillings so
11 you would have two base materials on which the liner
12 would be constructed. Those are geotechnical
13 considerations and again can be addressed in a design
14 aspect of that liner. We feel the liner does provide a
15 feasible alternative to make the site environmentally
16 sound.

17 DR. KINGHAM: Do you know of any case
18 where an attempt has been made to put a liner on an
19 incline on two different base materials and the liner
20 has survived?

21 MR. PETRIE: I do not and could not
22 speak to that.

23 MR. CRUTCHER: If I may add, I hope to
24 be able to address that a bit more in the operations
25 portion.



1 MR. PETRIE: To sum up again, the
2 tritium and chloride data can be viewed as providing a
3 measure of those portions of the rock which are more
4 hydraulically active and ignoring some of the tritium
5 data and it may be appropriate to do that and indeed it
6 could be verified by additional tritium sampling and it
7 would make it a less complicated picture or more
8 consistent picture vis-a-vis the chloride and tritium
9 for the more hydraulically active portions of the rock.
10 We feel exfiltration from the landfill or -- 50
11 millimetres per annum is a good number, but in
12 consideration of all of that I still feel there is
13 difficulty in predicting the performance of the site
14 and being able to monitor the site and there is some
15 measure of uncertainty as to how effective purge wells
16 would be to control contaminant migration should it
17 occur and the liner alternative, and there are some
18 design issues which must still be evaluated at greater
19 depth, but we feel the liner provides us with the
20 capacity to predict and monitor the site and, in that
21 sense we believe the liner would make the site
22 environmentally secure and more safe.

23 MR. MCQUAID: Thank you, Mr. Petrie.
24 Those are all my questions. Thank you, Mr. Chairman.

25 MR. LANCASTER: Thank you, Mr. McQuaid,



1 Q. Right. Now, you have noted on
2 B-864, native shale bedrock or landfill in the material
3 upon which the blanket and the clay liner would be
4 constructed. I want to ask you to go back to the
5 question that I guess Dr. Kingham put to you when you
6 were here on the hydrogeology panel, to comment upon
7 the aspects of whether or not such a liner can be
8 placed on this native shale bedrock or backfill without
9 any problems with respect to settlement or anything of
10 that nature.

11 A. I answered, I was a little
12 surprised by Dr. Kingham's question on dealing
13 essentially with the settlement of the liner in the
14 valleys because at that time I had not really
15 considered it as a particularly major issue, but I
16 didn't feel I could answer that without proper
17 consideration.

18 So, I went back to our geotechnical
19 people at the firm and posed that question to them. I
20 just want to find one -- I am referring to Drawing 6R.
21 I believe that is in Exhibit H-42. What I ...

22 Q. It may be H-42B, sir.

23 A. It is the revised drawing.

24 The question I posed to our geotechnical
25 people was the way I understood Dr. Kingham's question



1 was that if you take, for example, Section D which is
2 illustrated on Drawing 6R, you will see that there is a
3 significant infilling of the valley and placing of the
4 base of the landfill site on native shale bedrock. The
5 question that was posed to me was, in fact, would I be
6 concerned about failure of the liner at essentially the
7 fill location.

8 So, what I suggested that they look at
9 was, in fact, if we could calculate out what, in fact,
10 the settlements would be in the fill areas and, in
11 fact, use Section D, which turned out to be a fairly
12 worst case for the site.

13 We are looking at something like a five
14 or six-metre infilling of the valley in a somewhat
15 similar taking off of the hills. Their initial
16 comment was they did not feel that there would be much
17 of a problem but they went through the exercise of
18 actually doing the calculations. The bottom line of
19 the review was that, in fact, they had benefited by
20 some work that was undertaken by Morrison, Beatty back
21 in 1981. They had asked Golders to do some compaction
22 testing on the shale itself.

23 So, there is a report within the
24 Morrison, Beatty Report, which provides what I would
25 call background information on the compaction of the



1 shale and the Procter densities and such. We don't
2 need to refer to it, but we used that information, the
3 elevations as presented on Section D and did a
4 calculation of the actual settlement within that
5 particular area with a loading of approximately 25
6 metres of refuse on top of the liner.

7 The calculations indicated that
8 settlement would be anywhere from 55 to 75 millimetres.
9 That is a settlement, a vertical settlement. We also
10 note that that interface between the native and the
11 fill area would not, in fact, be vertical. So, when
12 you are talking, I will refer to that as inches, a two
13 to three-inch settlement, that is a settlement over a
14 fairly significant area so there will be a very slight
15 dip in the liner, or conversely you can overbuild that
16 area by that very small amount.

17 The one caution that they provided was,
18 in fact, that the slopes that the cuts were in the
19 valleys would have to be approximately three to one.
20 So, in fact, you did not have a significant grade
21 change where there is settlement that will occur, so it
22 is evenly spread around settlement.

23 The settlement or the effect of a two to
24 three-inch settlement on the liner, the thought is that
25 that would not even be measurable and the clay itself



1 has a certain plasticity and in fact, it will bend. We
2 did not foresee any problems itself.

3 As the other part of the question that
4 was posed to me by Dr. Kingham was, is there any
5 particular examples you could refer to? Our firm is
6 quite extensively involved in quite a number of
7 remedial works at sites. This aspect of a lining in an
8 area where, in fact, the soils are questionable below
9 is, we have been quite involved in that particular
10 area. The area -- I cannot give you an example on
11 shale that directly applies, but in fact, there is a
12 number of sites where, in fact, we have placed a liner
13 over fill areas. That being in one particular case, an
14 old building was demolished. It was placed down into
15 the hole. Everything was compacted, the liner was
16 placed on top of that for the remainder of the waste
17 areas. We were cleaning up a whole site. In fact, that
18 went through a full review and the concerns with
19 settlement were addressed and were not a major concern.

20 I should also note that in that
21 particular case, the liner was a synthetic liner, being
22 polyethylene, but the same principles apply.

23 So, I think I have provided to you,
24 Dr. Kingham, a guess off the top of my head of an inch
25 or two of settlement and word gets back to me that two



1 to three would be a bit closer.

2 Q. Any other observations that you
3 wish to make with respect to the liner, Mr. Crutcher?

4 A. I note with -- not dealing with
5 the hydrogeological aspects of the liner, but the
6 actual placement, once the site is pregraded
7 essentially to the grades as presented by Mr. Hiraishi,
8 the liner placement is rather straightforward and
9 standard engineering practice and the integrity of the
10 liner, you can have a high assurance on the integrity
11 of the liner and we have, in addition, the ability to
12 monitor that for verification purposes.

13 Q. Then continuing in the report at
14 page 57, there are some recommendations made with
15 respect to the access road and site facilities. Could
16 you just explain?

17 A. These are quite small points and
18 in fact, I think they are probably best dealt with by
19 Mr. Mereu when he deals with the costs because it would
20 be a little more efficient to put that in at that time.

21 Q. Stormwater collection and control
22 management?

23 A. As we indicated in Part B one of
24 the comments primarily from the Halton Region
25 Conservation Authority was the methodology used for



1 --- Upon resuming at 2:00 p.m.

2 MR. LANCASTER: Thank you, please be
3 seated. Do you have any cross-examination of these
4 witnesses?

5 MR. HODGSON: No, I do not.

6 DR. KINGHAM: Mr. Gray, I just have one
7 question for you and it is really very much on the
8 lines of the question I asked Mr. Crutcher.

9 You used the expression in your cross-
10 examination this morning, that the clays when compacted
11 to 95 per cent standard Proctor, would be virtually
12 incompressible. Nothing is really absolutely
13 incompressible, is it?

14 MR. GRAY: No, you are quite correct.
15 Considering the fact that the base would be very
16 uniform in terms of the native weathered shale or the
17 well compacted shale that has been infilled in the
18 valleys we have only a metre of clay that is compacted.
19 If you took a fraction of one per cent of the thickness
20 of the clay liner, you are really talking in terms of
21 millimetres. If you could even measure it in terms of
22 the compressibility due to the refuse over top.

23 DR. KINGHAM: The question I had put to
24 Mr. Crutcher, and I eventually want to put to you, had
25 to do with the whole layered structure that one would



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1 have. Your plan as was the plan of the Region and
2 CRA's plan, is to fill in the river valleys or stream
3 valleys.

4 MR. GRAY: That is correct.

5 DR. KINGHAM: With, in your case, shale.

6 MR. GRAY: That is correct, yes.

7 DR. KINGHAM: You compact the shale and
8 you told us it would be graded on the sides of the
9 stream bed.

10 MR. GRAY: That is correct.

11 DR. KINGHAM: What is the deepest valley
12 you have to fill in?

13 MR. GRAY: It would be in the order of
14 six metres.

15 DR. KINGHAM: You have six metres or so
16 of shale and then one metre of clay also compacted.

17 MR. GRAY: That is correct.

18 DR. KINGHAM: Then you would have the
19 refuse placed on top of that. Do you have any sense of
20 what the slope is of the landfill from the northwest to
21 the southeast lie of the land?

22 MR. GRAY: It is fairly gentle. I think
23 there is about -- I don't know the specifics in terms
24 of the overall trend, but it is about a five per cent
25 slope overall, regionally. Once you get into the area



1 of the watercourses, some of those side slopes are
2 close to 45 degrees. I think the concern that we
3 would have and I know I read testimony in regard to it,
4 is the potential for differential movement of the
5 liner. If we were putting our liner right on the
6 shale, the native shale and on areas, if we didn't cut
7 back and sort of feather the transition zone, if we
8 made it very abrupt like it is out in the field, you
9 could have, within a distance of maybe from here to the
10 end of the room where the clay liner is sitting on the
11 incompressible native shale and as much as maybe 10
12 metres away, it would be sitting on that deep thickness
13 of compacted shale.

14 In that transition zone, you might be
15 worried about stress and strain on the liner.

16 DR. KINGHAM: Is that your plan or your
17 understanding of Mr. Hiraishi's plan as well?

18 MR. GRAY: There was testimony given
19 regarding the order of magnitude of settlement even
20 considering the six metres of compacted material. It
21 was only going to be 50 millimetres, plus or minus, a
22 matter of a few inches, but looking at the concepts,
23 not only theoretically of the settlement of the clay
24 liner but the practical aspects in the field you
25 couldn't have dump trucks going up 45 degree slopes.



1 You would be knocking off the caps of some of those
2 hills and slopes just to get them three to one or even
3 flatter, so scrapers and your trucks could be mobile
4 around.

5 DR. KINGHAM: Do you know what the
6 loading of refuse is going to be in terms of tons per
7 acre or pounds per square foot or whatever?

8 MR. GRAY: I don't know.

9 DR. KINGHAM: Do you know what it is
10 going to be relative to the other landfill in the area?

11 MR. GRAY: I would only be guessing. I
12 think it is 30 or 40 metres of some sort. It is
13 significant. I know the settlement analysis that was
14 gone through for our firm at Keele Valley. We were
15 looking for 200 feet of refuse. We were interested in
16 that same potential problem of settlement of the liner
17 and the matter of the subgrade performance.

18 But, in that case, we had granular soils
19 that were going to settle almost immediately under the
20 weight of the new fill. Here, except for those infill
21 valleys you are talking at least an order of magnitude
22 less compressibility in terms of the weathered shale as
23 opposed to a sand and gravel.

24 DR. KINGHAM: So, as was my question to
25 Mr. Crutcher at the time, do you have any knowledge or



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1 experience of a situation where stream valleys have
2 been filled with one kind of material, in this case,
3 weathered, recompacted shale on undisturbed shale and
4 then had a liner placed on top and refuse placed on top
5 of that.

6 MR. GRAY: To answer your question very
7 specifically, I haven't got any experience in that
8 scenario, but I know from the work that I have done
9 with analysis of subgrades for tailings dams where we
10 are putting 50, 60 feet of compacted earth over
11 subgrades, we often have to remove peat and organic
12 material, we have to blast rock to fit in the compacted
13 fill. It is something that if there is proper
14 attention given to the design dovetailing the
15 transition zones, you don't normally have a settlement
16 problem if you have got strict quality control and your
17 benchmark is high enough, like the 95 per cent Proctor
18 density.

19 If that can be achieved, then the
20 settlement isn't really an issue.

21 DR. KINGHAM: The other side of that
22 coin, I guess would be if you assume a relative
23 incompressibility and a saturated remoulded shale. Do
24 you have any concerns about the plasticity of the
25 material under that loading at the bottom side of the



1 landfill?

2 MR. GRAY: No, in fact, the moisture
3 really is added to facilitate compaction, to facilitate
4 density and permeability to have a low level of
5 permeability.

6 As I say, by knocking off and really
7 over-excavating, there will be areas that you could
8 stop and have the material one metre below your design
9 landfill level, but the slope would be too steep.

10 So, from a practical standpoint, from a
11 construction standpoint, you over-excavate to get a
12 three to one slope through those areas of steeply
13 sloping side ...

14 DR. KINGHAM: Perhaps you are not
15 understanding my question. Perhaps I will restate it
16 so that it is absolutely clear to both of us. You
17 have undisturbed shale into which you have put
18 remoulded shale, if I can call it that, on top of which
19 you put a liner and landfill. The result being,
20 based on the evidence we have heard here, that there
21 may be a lot of water content in that strata beneath
22 the liner, perhaps saturated with water.

23 Do you, as a geotextile expert, have any
24 concerns about slumping or other deformation of the
25 material now which is saturated and lying beneath that



1 great mass of refuse?

2 MR. GRAY: I wouldn't have the concern
3 as long as the shale is placed and compacted properly.
4 If it is put in a loose state, then with time, the
5 moisture and the leachate that would infiltrate could
6 cause softening of the shale and you could get some
7 uncalled for settlement.

8 If there is the quality control during
9 the placement of the shale, it will be dense enough and
10 strong enough that it will be virtually incompressible
11 relative to the loads that are on top of it. It
12 wouldn't give, induce settlement.

13 DR. KINGHAM: That is the
14 compressibility question again. You said virtually
15 incompressible this morning. If you have a virtually
16 incompressible substance in the tube and you squeeze
17 the tube, what happens to the virtually incompressible
18 substance?

19 MR. GRAY: We are talking a situation
20 where if the soil wasn't compacted and water could get
21 into the material, it would lose some of its strength
22 and density and with the weight on top of it, there
23 could be some collapse of the soil structure. But we
24 are going to do the best we can in placing the material
25 in thin lifts and to reduce all of the void space so



1 that it has such a high density there isn't the pore
2 space for the water to get in and cause any softening.

3 DR. KINGHAM: Thank you.

4 MR. LANCASTER: Mr. Estrin, re-
5 examination?

6 RE-EXAMINATION BY MR. ESTRIN:

7 Q. Mr. Gray, dealing, first of all,
8 with the question from Dr. Kingham, I wonder if we can
9 go at that again to the extent we can address it in
10 another way.

11 Dr. Kingham used the analogy of a
12 toothpaste tube. Perhaps if we imagine some analogy
13 of the toothpaste tube to the concept that the valley
14 is somehow going to liquidize or something like that
15 once you start filling it in and have water coming into
16 it, I am not sure. The concern seems to be filling in
17 a valley with something and then what happens with
18 water getting into that?

19 Do you have any concern in that sense of
20 it moving?

21 MR. GRAY: A. We have had examination
22 of some of the performance of shale in sewer trenches
23 were again there may have been not as much quality
24 control as might be desired. The shale, if it isn't
25 broken down properly by the equipment, tends to go into



1 the trench in maybe thicker slabs and you can actually
2 have some voids in the actual backfill.

3 When water is allowed to percolate in
4 through the backfill, it can soften the contact points
5 between the shale and as the water and shale combine,
6 you will get some slippage of the soil and rock in the
7 trenches. That is the aspect that I think possibly
8 would concern about the flow of water through the
9 valleys that there could be this softening of the
10 material and subsequent settlement after the fact.

11 It might even be a year or two after the
12 actual material is in, but if we densify the material
13 as we build up the infilled valleys there isn't the
14 void space and the actual shale is broken down such
15 that we don't have ...

16 DR. KINGHAM: I think you are trying to
17 answer the question and Mr. Estrin is very helpfully
18 trying to state it clearly, but I think you still
19 haven't got it. We are not talking about void space
20 here. We are talking about the analogy between wet
21 cement and hardened cement.

22 If you fill the river valleys with
23 hardened cement and put garbage on top, you would not
24 expect that cement would ooze out of the bottom of the
25 river valleys.



1 If you filled it with wet cement and
2 were instantly able to put 1,000 tons of garbage on
3 top, you would expect to squeeze all of that cement out
4 of the river valley. Where does your remoulded shale
5 fit into that spectrum between something that will
6 slump out under the weight of the garbage and something
7 that will remain absolutely fixed under the weight of
8 the garbage.

9 MR. GRAY: It is very close to the far
10 end of the scale where things are fixed. It just
11 doesn't have that moisture content to flow as a
12 toothpaste type material.

13 DR. KINGHAM: Thank you, Mr. Estrin.
14 That is what I think we looked for in the first set of
15 questions.

16 MR. ESTRIN: Q. Mr. Gray, some
17 questions then arising from cross-examination and
18 particularly that of Mr. Tzekas. He asked you in some
19 detail about your experience and in particular, your
20 experience with landfills. Your opinions here to the
21 Board, centrally deal -- I take it you would agree --
22 with the issues of practicality of constructing a
23 liner. That is one issue that you have addressed an
24 opinion on.

25 MR. GRAY: A. Yes, I have.